

Application Serial No.: 09/614,682
Applicant(s): Summers et al.

Docket No.: N.C. 79,812

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1 (canceled)

Claim 2 (previously presented) The method of Claim 7, wherein said back bias is less than the breakdown voltage of drain-substrate and source-substrate junctions.

Claim 3 (previously presented) The method of Claim 7, wherein said back bias is between about -5 V and about -0.1 V.

Claim 4 (previously presented) The method of Claim 7, wherein said back bias is between about -3V and about -1 V.

Claims 5-6 (canceled)

Claim 7 (previously presented): A method for operating a bulk CMOS or NMOS device to resist total dose radiation effects due to charge build up in a field oxide, said method comprising the steps of:

selecting a maximum ionizing radiation dose for operation of said bulk CMOS or NMOS device, wherein said CMOS or NMOS device comprises a Si substrate; two or more FETs on said substrate; a field oxide region separating each FET; a negative voltage source for applying a steady negative back bias to a NMOS region of said substrate and for increasing the threshold voltage of the field oxide region to reduce leakage currents due to radiation damage in said field oxide region thereby mitigating total dose radiation effects, and wherein a bulk CMOS device does not include an insulator beneath said FETs; and

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determining and applying said negative back bias to said substrate of NMOS components of said bulk CMOS or NMOS device, wherein said negative back bias is sufficient to essentially eliminate leakage currents due to total dose radiation in said field oxide region of said CMOS or NMOS device thereby providing hardness against said maximum ionizing radiation dose.

Claims 8-9 (canceled)

Claim 10 (previously presented) The method of claim 7, wherein said CMOS or NMOS device has a threshold voltage within a selected operating range while steady negative back bias is applied.

Claim 11 (previously presented) The method of claim 7, wherein said between 0 and 0.8 V while said steady negative back bias is applied.

Claims 12-18 (canceled)